The goal of this study was to examine the rates of HPV-16 and 32 in HIV+ individuals over the past 10+ years. It’s unclear why warts, has increased by 3 fold in the HIV+ population. Data from the Hagensee laboratory has shown that over 50% of the oral warts contain HPV-32 in them. In the HPV population there is no decrease in these despite HAART (Highly active anti-retroviral therapy). It’s unclear why the HPV+ population on HAART have steady rates of HPV-16 & HPV-32 infections. The goal of this study was to examine the rates of HPV-16 and 32 in HIV+ individuals over the past 10 years.

Methodology

Study #1 – cross sectional study of over 400 individual HIV+ patients from 2002-2005 examining the rates of oral HPV infection

Six samples were collected from recruited subjects from the mouth including: lips, gums, tongue, tonsil, cheek, under the tongue. A saliva and gargle sample was also obtained. These samples were tested for HPV-16 by the Reverse Line Dot PCR Assay and for HPV-32 by line blot, dot blot and PCR assays. All sites were combined in this analysis.

Fig. 1 Subjects positive for HPV-16 and/or HPV-32 stratified by their age.

Study #2 – 1st visit of longitudinal study of HIV+ patients from 2008-2009 (18 month study at 3 month intervals) examining the duration of oral HPV infection

Six samples were collected from recruited subjects from the mouth including: lips, gums, tongue, tonsil, cheek, under the tongue. A saliva and gargle sample was also obtained. These samples were tested for HPV-16 by the Reverse Line Dot PCR Assay and for HPV-32 by a type specific PCR assays. All sites were combined in this analysis.

Study #3 – 1st visit of study from 2013-2014 examining the oral microbiome and its relationship to oral HPV infection

A gargle sample was collected from recruited subjects. DNA extraction was performed using the Qiagen DNA mini kit. HPV-16 and HPV-32 was detected using a type specific PCR assay.

Statistical analysis was performed using SPSS version 22.

Study #4 – cross sectional study of over 400 individual HIV+ patients from 2002-2005 examining the rates of oral HPV infection

Six samples were collected from recruited subjects from the mouth including: lips, gums, tongue, tonsil, cheek, under the tongue. A saliva and gargle sample was also obtained. These samples were tested for HPV-16 by the Reverse Line Dot PCR Assay and for HPV-32 by line blot, dot blot and PCR assays. All sites were combined in this analysis.

Study #5 – 1st visit of longitudinal study of HIV+ patients from 2008-2009 (18 month study at 3 month intervals) examining the duration of oral HPV infection

Six samples were collected from recruited subjects from the mouth including: lips, gums, tongue, tonsil, cheek, under the tongue. A saliva and gargle sample was also obtained. These samples were tested for HPV-16 by the Reverse Line Dot PCR Assay and for HPV-32 by a type specific PCR assays. All sites were combined in this analysis.

Study #6 – 1st visit of study from 2013-2014 examining the oral microbiome and its relationship to oral HPV infection

A gargle sample was collected from recruited subjects. DNA extraction was performed using the Qiagen DNA mini kit. HPV-16 and HPV-32 was detected using a type specific PCR assay.

Statistical analysis was performed using SPSS version 22.

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Conclusions

Subjects with a CD4 T-cell count between 201-500 cells/mm³ had an increased rate of HPV-16 and/or HPV-32 positive infections than those with counts <200 or >501 but this was not statistically significant.

Subjects who were between the ages of 41-50 had an increased rate of positive HPV-16 and/or HPV-32 infections than those who were ages 1-30, 31-41, and/or >50 but this was not statistically significant.

Subjects who were male had an increased rate of positive HPV-16 and/or HPV-32 infections than females but this was not statistically significant.

African Americans had an increased rate of positive HPV-16 and/or HPV-32 infections when compared to Whites yet this was not statistically significant.

Subjects with a 1-1,000 copies/ml HIV viral load had an increased rate of HPV-16 and/or HPV-32 infections than those with a viral load of 1,001,100,000 and/or >100,001 but this was not statistically significant.

Subjects between year 2008-2009 had an increased rate of HPV-16 infections compared to those between the years of 2002-2005 and 2013-2014. Overall, a strong statistical difference in the HPV-16 rates by year (p=0.004) with specific significant decreases seen between 2002 and 2003-5 (p=0.048) as well as between 2008-9 and 2013-14 (p=0.011). This may be partially explained by an increase in age of the 2013-14 study participants.

FUTURE DIRECTIONS – plan to implement strategies to analyze the role of HAART (Highly active anti-retroviral therapy) in the rates of oral HPV-16 and 32 in these patients.

Human papillomavirus (HPV) infection is linked to most if not all cervical cancer and oral cancer. HPV-16 is the cause of approximately 33% of head and neck cancers and up to 50% of tonsillar cancers. HPV-16 has been linked to about 60% of all HPV-related cervical cancers, 80% of anal cancers and over 50% of HPV-related oral cancers. Research is ongoing to look at HPV infections in the oral cavity. In particular, HPV-16 is linked to oral cancers which are increased in the HIV+ population (2.4 fold). In addition, HPV-32, which has been associated with the presence of oral warts, has increased by 3 fold in the HIV+ population. Data from the Hagensee laboratory has shown that over 50% of the oral warts contain HPV-32 in them. In the HPV population there is no decrease in these despite HAART (Highly active anti-retroviral therapy). It’s unclear why the HPV+ population on HAART continue to have steady rates of HPV-16 & HPV-32 infections.

Table 1: The reasons for the drop in HPV-16 oral infection rate is not clear. Further evaluation is needed to understand the drop in cervical cancer in the 2013 group as compared to the 2002-2005 group.

Fig. 2 Subjects positive for HPV-16 and/or HPV-32 stratified by their gender.

Fig. 3 Subjects positive for HPV-16 and/or HPV-32 stratified by CD4 T-cells.

Fig. 4 Subjects positive for HPV-16 and/or HPV-32 stratified by age.

Fig. 5 Subjects positive for HPV-16 and/or HPV-32 stratified by their age.

Fig. 6 Subjects positive for HPV-16 and/or HPV-32 stratified by their race.